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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/854,653	05/14/2001	Nam-Heon Kim	5000-1-203	8782

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EXAMINER
BEREZNY, NEAL

ART UNIT	PAPER NUMBER
2823	

DATE MAILED: 07/14/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Application No.	Applicant(s)	
09/854,653	KIM, NAM-HEON	
Examiner	**Art Unit**	
Neal Berezny	2823	

Office Action Summary

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 January 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-12* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-12* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *14 May 2001* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s). _____
4) ☐ Interview Summary (PTO-413) Paper No(s). _____
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other

DETAILED ACTION

Drawings

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the forming an InGaAs layer which selectively covers the top surface of the undoped InP layer; forming a mask layer in strips which selectively covers the top surface of the InGaAs layer, and selectively etching the mask layer and the InGaAs layer to a predetermined depth must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

2. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

3. The drawings are objected to under 37 CFR 1.83(a) because they fail to show Zn-diffusing layer 34, p.6, ln.6-8, nor trench region 43, p.7, ln.5-6, nor el.41 and 42, p.7, ln.10-12 as described in the specification. Any structural detail that is essential for a proper understanding of the disclosed invention should be shown in the drawing. MPEP § 608.02(d). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

4. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference characters "21", "31", and "41" have all been used to designate the diode region. A proposed drawing correction or corrected drawings are required in reply

to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

5. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference characters "22", "32", and "42" have all been used to designate the modulator region. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

6. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "41" has been used to designate both a diode region and a metal layer. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

7. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "42" has been used to designate both a modulator region and a metal layer. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

8. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference characters "41" and "42" have both been used to designate metal layers. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

9. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description:

A. p.5, ln.15-17, fig.2, el.24;

B. p.6, ln.1, fig.3, el.33;

C. p.6, ln.6-8, fig.3, el.31, 32, and 34;

D. p.7, ln.5-6, fig.4, el.43;

E. p.7, ln.10-12, el.41 and 42.

10. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

11. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "31" has been used to designate both Zn diffused region and clad layer. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

12. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "32" has been used to designate both Zn diffused region and capping layer. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

13. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference characters "31" and "32" have both been used to designate Zn diffused regions. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Specification

14. 35 U.S.C. 112, first paragraph, requires the specification to be written in "full, clear, concise, and exact terms." The specification is replete with terms which are not clear, concise and exact. The specification should be revised carefully in order to comply with 35 U.S.C. 112, first paragraph. Examples of some unclear, inexact or verbose terms used in the specification are:

A. p.5, ln.15-17, fig.2, el.24;

B. p.6, ln.1, fig.3, el.33;

C. p.6, ln.6-8, fig.3, el.31, 32, and 34;

D. p.7, ln.5-6, fig.4, el.43;

E. p.7, ln.10-12, el.41 and 42;

F. p.7, ln.1-3, el.31 and 32;

G. p.5, ln.13-14, el.21 and 22.

Claim Rejections - 35 USC § 103

15. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

16. Claims 1-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chraplyvy et al. (4,905,253) in combination with Takagi et al. (6,455,338). Chraplyvy teaches a method of fabricating an electro-absorption modulator-integrated laser (EML) for optical communication, comprising the steps of: preparing a compound semiconductor structure having a laser diode section and a modulator section growing simultaneously; fig.1, el.11 and 12, forming a two step InP layer, a bottom layer consisting of a P-InP layer and a top layer consisting of an undoped InP layer, on the top surface of the compound semiconductor structure; fig.3, el.26, 27; col.5, ln.57-63, forming a cladding layer which selectively covers the top surface of the undoped InP layer; fig.3, el.28, col.5, ln.67-68, depositing Zn or a Zn compound on the top surface of the laser diode section and the modulator section except for the trench region; fig.3, el.24, 30, selectively etching the cladding layer to a predetermined depth; fig.3, el.32. Chraplyvy does not appear to specifically state that wherein the mask layer is formed by one of Si02 and SiNx to prevent Zn diffusion; nor wherein Zn diffusion is performed in a Zn diffusion facilitating temperature range; nor wherein the Zn compound is one of ZnO, Zn3As2, and Zn3P2; nor further comprising the step of forming a metal layer on the top of the laser diode section and the modulator section after the etching step; nor further comprising the step of removing the mask layer after the diffusion step; nor that the cladding layer is composed of InGaAs; nor forming a mask layer in strips which selectively covers the top surface of the InGaAs layer, defining a trench region between

the laser diode section and the modulator section; nor the step of diffusing the Zn; nor the step of etching the mask layer.

17. Takagi teaches using InGaAs as a cladding layer, fig.9b, el.28; col.14, ln.10-14; inherently forms a mask layer in strips which selectively covers the top surface of the InGaAs layer, defining a trench region between the laser diode section and the modulator section; col.14, ln.15-21, wherein the anticipated mask layer is formed by one of Si02 and SiNx type masking materials found in other steps; col.14, ln.22-25, and further comprising the step of forming a metal layer on the top of the laser diode section and the modulator section after the etching step; fig.10 and 12, el.62, 64. It would have been obvious to one of ordinary skill in the art at the time of the invention to combine The teachings of Takagi with Chraplyvy to use InGaAs as a cladding material and to use an oxide as a masking material, since both materials are well known in the art and are known to be art recognized equivalents in terms of cladding and masking, respectively.

18. Further, the step of diffusing the Zn; wherein Zn diffusion is performed in a Zn diffusion facilitating temperature range; the step of etching the mask layer; and the step of removing the mask layer after the diffusion step are all well known in the art and would be obvious to one skilled in the art. It would have been obvious to one of ordinary skill in the art at the time of the invention to etch and dispose of the mask layer once the mask has completed its function. Also, the step of diffusing the Zn would be obvious because it well known in the art that diffusing a metal into the substrate below it

results in vastly improved adhesion of the metal layer to the substrate. Further, it is inherent that some Zn will diffuse at any temperature, even at room temperature.

19. Finally, it should be noted that the limitation, wherein the Zn compound is one of ZnO, Zn3As2, and Zn3P2; for claims 5 and 11, although further limiting the parent claims, do not further limit the instant rejection because in the parent a choice is given between Zn and a Zn compound. The dependent claims to not further limit Zn, but only the Zn compound, thus not excluding the use of Zn.

Conclusion

20. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Neal Berezny whose telephone number is (703) 305-1481. The examiner can normally be reached on M-F 9:00 - 5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on (703) 306-2794. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7724 for regular communications and (703) 308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

NB
June 30, 2003